|  |  |  |  |  |  |  |  |  |
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|  | **Unit 2: Cells & Cell Processes** | | | | | | | |
| Name: | | Start Date: | | | 11/ 06/17 |  |  |  |
|  | | Test 3 Date: | | | 12/11/17 |  |  |  |
| Period: | | Teacher: Ms. J | | | |  |  |  |
|  | |  |  |  |  |  |  |  |
| **Cells** | | Submitted | Resubmit | Correct | Evidence of Learning | Page # | Date | Sign-Off |
| **Objective 8:** Explain how homeostasis is maintained in a cell in various environments. | |  |  |  | Catalyst: Organelle Review |  |  |  |
|  |  |  | Activity: Making a Membrane |  |  |
|  |  |  | HW: Cell Membrane Reading |  |  |
|  |  |  | Catalyst: Vocab roots |  |  |
|  |  |  | Notes: Cell Membrane and Transport |  |  |
|  | |  |  |  | Lab: Diffusion in a Baggie |  |  |  |
|  | |  |  |  | HW: Vocabulary Review |  |  |  |
|  | |  |  |  | Catalyst: Transport Review |  |  |  |
|  | |  |  |  | Virtual Lab: Passive Transport |  |  |  |
|  | |  |  |  | HW: Vocabulary Practice |  |  |  |
|  | |  |  |  | Catalyst- TBD |  |  |  |
|  | |  |  |  | Activity- Modeling Transport |  |  |  |
|  | |  |  |  | Quiz: Objective 8 |  | 12/4 |  |

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| **Unit 2: Cells & Cell Processes** | | | | | | |
| Name: | Start Date: | | | 11/ 06/17 |  |  | |  |
|  | Test 3 Date: | | | 12/11/17 |  |  | |  |
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|  |  |  |  | Lab: Diffusion in a Baggie |  |  | |  |
|  |  |  |  | Virtual Lab: Passive Transport |  |  | |  |
|  |  |  |  | HW: Vocabulary Practice |  |  | |  |
|  |  |  |  | Catalyst- TBD |  |  | |  |
|  |  |  |  | Activity- Modeling Transport |  |  | |  |
|  |  |  |  | Quiz: Objective 8 |  | 12/4 | |  |

**Unit 2: Cells & Cell Processes**

**Objective 6:** Compare prokaryotic and eukaryotic cells in terms of their general structures (plasma membrane and genetic material) and degree of complexity.

*Essential Question:* How do prokaryotes and eukaryotes differ?

*“I Can” Statements:*

* Compare and contrast prokaryotes and eukaryotes

**Objective 7:** Summarize the structure and function of organelles in eukaryotic cells (including the nucleus, plasma membrane, cell wall, mitochondria, vacuoles, chloroplasts, and ribosomes) and ways that these organelles interact with each other to perform the function of the cell.

*Essential Question:* What are the main organelles (nucleus, plasma membrane, cell wall, mitochondria, vacuoles, chloroplasts, and ribosomes) and their functions?

*“I Can” Statements:*

* Identify the structure and function of organelles
* Explain the interactions of organelles (e.g. nucleolus 🡪 ribosome 🡪 ER 🡪 Golgi)
* Use a compound light microscope

**Objective 8:**  Explain how homeostasis is maintained in a cell and within an organism in various environments (including temperature and pH).

*Essential Question:* How do cells maintain homeostasis?

*Essential Question:* How do organisms maintain homeostasis?

*“I Can” Statements:*

* Model the way a plasma membrane functions to control the way particles move in/out of a cell
* Predict the movement of water and/or solutes across the cell membrane, given a set of conditions
* Explain how energy is used to maintain homeostasis

**Important Vocab:**

* Cell
* Cell Wall
* Chromosome
* Cytoplasm
* Diffusion
* Endocytosis
* Exocytosis
* Eukaryote
* Homeostasis
* Hydrophilic
* Hydrophobic
* Hypertonic
* Hypotonic
* Isotonic
* Nucleus
* Organelle
* Osmosis
* Phagocytosis
* Phospholipid
* Plasma membrane
* Plasmid
* Pinocytosis
* Prokaryote
* Ribosome
* Selectively Permeable

**Catalyst 1: Organelle review**

1. What is the function of the plasma membrane? What part of the school is like the plasma membrane?

2. What is the function of a vesicle?

3. What does it mean to maintain homeostasis? Give an example.

4. What is a membrane-bound organelle? Give an example.

**Catalyst 2: Vocabulary Roots**

* Endo/cyto/sis-
* Exo/cyto/sis-
* Phago/cyto/sis-
* Pino/cyto/sis-
* Hyper/tonic-
* Hypo/tonic-
* Iso/tonic-
* Hydro/philic-
* Hydro/phobic-

## Biology I Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Activity: Building a Membrane Period: \_\_\_\_ Date: \_\_\_/\_\_\_/\_\_\_

Thinking back to what we know about water, recall that water molecules are polar. Because they are polar, they have a partial charge around each atom. Phospholipids, the main component of the membrane, also have a partial charge, which makes their relationship with water kind of tricky sometimes. Water has an overall slightly negative charge while the heads of phospholipids had a positive charger and the tails a negative charger. Cells are exposed to water both internally and externally. Water molecules make up most a cells external environment, and at least 70% of the cytoplasm inside a cell. So how exactly do phospholipids make a membrane in all that water? Let’s find out!

First, here are some basic rules about phospholipids and water:



Hydrophilic (water-loving) head

Opposites attract!

+

Hydrophobic (water-repelling) tails

-

-



**Challenge #1: Assemble the phospholipids to form a layer across the surface of the beaker.**

Draw your final product in the beaker depicting the position of the phospholipids and the water.



**Challenge #2: Assemble your phospholipids so that they are totally submerged in the water.**

Draw your final product in the beaker depicting the position of the phospholipids and the water.



**Challenge #3: Assemble the phospholipids so that they can carry the protein molecule inside, like a vesicle transporting it around the cell. (Hint: vesicles are not filled with air, they are filled with cytoplasm too so that means there will be water on the inside of your structure too.)**

Draw your final product in the beaker depicting the position of the phospholipids, protein molecule and the water.

**Analysis Questions**

1. Why couldn’t you have the phospholipid tails directly interacting with the water?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. How did you arrange your phospholipids so that the tails were not interacting with the water?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. What did you have to do with your phospholipids to carry the protein molecule?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Which scenario best represents the structure of the cell membrane, and why?

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## Biology I Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Homework: Membrane Reading Period: \_\_\_\_ Date: \_\_\_/\_\_\_/\_\_\_

# ell membrane is like a plastic bagCell Membranes

According to **cell theory**, cells are the smallest unit of life in biology. Whether you are a single cell or a blue whale with trillions of cells, you are still made of cells. All cells are contained by a **cell membrane** that keeps the pieces inside. When you think about a membrane, imagine it is like a big plastic bag with some tiny holes. That bag holds all of the cell pieces and fluids inside the cell and keeps any nasty things outside the cell. The holes are there to let some things move in and out of the cell. 

**1. What is the function of the cell membrane?**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# ell membrane Fluid mosaic modelFlexible Containers

The cell membrane is not a solid structure. It is made of millions of smaller molecules that create a flexible and porous container. **Proteins** and **phospholipids** make up most of the membrane structure. The phospholipids make the basic bag. The proteins are found around the holes and help move molecules in and out of the cell. There are also proteins attached to the inner and outer surfaces of the membrane.   
  
Scientists use the fluid mosaic model to describe the organization of phospholipids and proteins. The model shows you that phospholipid molecules are shaped with a head and a tail region. The head section of the molecule likes water (**hydrophilic**) while the tail does not (**hydrophobic**). Because the tails want to avoid water, they tend to stick to each other and let the heads face the watery (**aqueous**) areas inside and outside of the cell. The two surfaces of molecules create the **lipid bilayer**. 

**2. What is the difference between hydrophobic and hydrophilic?**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**3. What part of a phospholipid is hydrophobic? What part is hydrophilic?**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Ingrained in the Membrane

What about the [membrane proteins](http://www.biology4kids.com/files/cell_membprot.html)? Scientists have shown that many proteins float in the lipid bilayer. Some are permanently attached while others are only attached temporarily. Some are only attached to the inner or outer layer of the membrane while the transmembrane proteins pass through the entire structure. The transmembrane proteins that cross the bilayer are very important in the [active transport](http://www.biology4kids.com/files/cell2_activetran.html) of ions and small molecules. Because the membrane is made up of many different types of molecules, it is often described as a **Fluid-Mosaic model**. The membrane is considered to be fluid because the individual phospholipids can move around, making the membrane very flexible. We also consider it to be a mosaic because of all the different types of proteins found in the membrane.   
  
**4. Why is the cell membrane referred to as a Fluid-Mosaic Model?**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

# Membrane Proteins - Bumpy Surfaces

Cell membranes are basic bilayers made of lipids that surround the cell and organelles. Cell membrane are mainly composed of phospholipids, made of a hydrophilic head and two hydrophobic tails in the form of a bilayer. The **lipid bilayer**is not smooth because there are a variety of proteins attached to the surface and embedded in the membrane. You will find millions of embedded protein molecules when you look at the cell membrane. Each type of protein has a specific purpose. Examples of membrane proteins include ion channels, receptor proteins, and proteins that allow cells to connect to each other. 

**5. Fill in the blank:**

**The cell membrane is composed of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, that form a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ meaning that the lipids arrange themselves in two layers facing opposite directions.**

# A Tale of Two Types

You will learn about two types of membrane proteins: **peripheral** proteins and **integral** proteins. Peripheral proteins sit on the edge or outside of the membrane and have weaker and temporary connections to the membrane. Some just sit on the surface, anchored with a few ionic bonds while others might have small sections that dip into the hydrophobic section of the bilayer. When you look at the entire membrane, there are more peripheral proteins when compared to the number of integral proteins. 

Integral proteins, meaning they make up a larger part of the membrane because they reach both sides, are permanently connected to the cell membrane. They are hard workers and are embedded in the **hydrophobic** (middle) layer of the membrane. **Transmembrane** proteins are integral proteins that cross the membrane and can act as pathways for ions and molecules.    
 **6. In the image below, label the following structure and color each structure accordingly:**

* + **-an integral protein (green)**
  + **-a peripheral protein (red)**
  + **-a phospholipid head (blue)**
  + **-phospholipid tails (yellow)**
  + **-circle one phospholipid**

## 

Modified from: http://www.biology4kids.com/files/cell\_membprot.html

## Biology I Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Notes: Cell Transport Period: \_\_\_\_ Date: \_\_\_/\_\_\_/\_\_\_

**Plasma (Cell) Membrane**

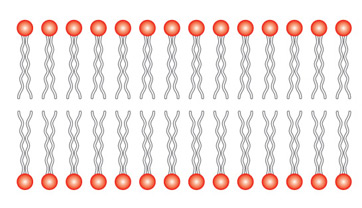
## Regulates what enters and leaves the cell

## \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: allows some substances in, but not others

## Fluid-Mosaic Model

**Fluid-Mosaic Model**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**with the polar heads pointing outward and the nonpolar tails pointing inward
* Embedded **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**used for transport, communication, adhesion, etc.



**Transport Across the Membrane**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
  + Requires no cellular energy
  + With the concentration gradient (from more to less)
  + balanced
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
  + Requires cellular energy
  + Against the concentration gradient (from less to more)
  + unbalanced

**Types of Passive Transport**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:** movement of molecules from high to low concentrations
  + Simple
  + Facilitated (uses proteins)
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:** movement of water from high to low concentrations

**Factor Affecting the rate of Diffusion**

* Steep Concentration Gradients
* Heat
* Size of Molecules
* Electric or Pressure Gradients

**Isotonic Solutions**

* two solutions that are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to each other (same concentrations)
* \_\_\_\_\_\_\_\_\_\_\_\_net movement of particles
* water will move in and out of cell at an equal rate

**Hypotonic Solutions**

* having \_\_\_\_\_\_\_\_\_\_\_\_\_than something else (lower concentration)
* water \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_the cell pictured below

**Hypertonic Solutions**

* having \_\_\_\_\_\_\_\_\_\_\_\_\_ than something else (higher concentration)
* water \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pictured below

**Why is it important for the cell membrane to control what enters and exits the cell?**

## Biology I Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Lab: Cell Transport Period: \_\_\_\_ Date: \_\_\_/\_\_\_/\_\_\_

# **How Can Diffusion Be Observed?**

Introduction: In this lab you will observe the diffusion of a substance across a semi permeable membrane. Iodine is a known indicator for starch. An indicator is a substance that changes color in the presence of the substance it indicates. Watch as your teacher demonstrates how iodine changes in the presence of starch.

Prelab Observations: Describe what happened when iodine came into contact with starch.

**Procedure:**

1. Fill a plastic baggie with a teaspoon of corn starch and a half a cup of water tie bag. (This may already have been done for you)
2. Fill a beaker halfway with water and add ten drops of iodine.
3. Place the baggie in the cup so that the cornstarch mixture is submerged in the iodine water mixture.
4. Wait fifteen minutes and record your observations in the data table
5. While you are waiting, answer the questions.

**Questions:**

1. Define diffusion. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Define osmosis. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Why is iodine called an indicator? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Molecules tend to move from areas of \_\_\_\_\_\_\_ concentration to areas of \_\_\_\_\_\_ concentration.

**What's in the Bag?**

We're going to think about concentrations now, which substances are more or less concentrated depends on which one has the most stuff in it.

1. Which is more concentrated in starch? [ beaker / baggie ]

2. Which is more concentrated in iodine? [ beaker / baggie ]

3. With regard to iodine, which is hypertonic? [ beaker / baggie ]

4. With regard to starch, which is hypertonic? [ beaker / baggie ]

### Make Some Predictions

1. If the bag is permeable to starch, which way would the starch move? [ into bag / out of bag ]

2. If the bag is permeable to iodine, which way would the iodine move? [ into bag / out of bag ]

3. If the bag is permeable to iodine, what color would you expect it to change? [ orange / purple / no change ]

What about the solution in the beaker? [ orange / purple / no change ]

4. If the bag is permeable to starch, what color would you expect it to change? [ orange / purple / no change ]

What about the solution in the beaker? [ orange / purple / no change ]

### Observations

Write your observations in the table below:

|  |  |  |
| --- | --- | --- |
|  | Starting Color | Color after 15 minutes |
| Solution in Beaker |  |  |
| Solution in Bag |  |  |

## Post Lab Analysis

1. Based on your observations, which substance moved, the iodine or the starch?

2. How did you determine this?

3. The plastic baggie was permeable to which substance?

4. Explain how the bag is a model for the cell.

5. Sketch the cup and baggie in the space below. Use arrows to illustrate how diffusion occurred in this lab

# **Homework: Vocab Review**

|  |  |
| --- | --- |
| Phospholipid bilayer |  |
| Hydrophilic |  |
| Hydrophobic |  |
| Fluid Mosaic Model |  |
| Integral Protein |  |
| Peripheral Protein |  |

|  |  |
| --- | --- |
| Pinocytosis  vs.  Phagocytosis |  |
| Diffusion |  |
| Osmosis |  |
| Active Transport  vs.  Passive Transport |  |
| Semipermeable |  |
| Facilitated Diffusion |  |

|  |  |
| --- | --- |
| Isotonic |  |
| Hypertonic |  |
| Hypotonic |  |
| Homeostasis |  |
| Endocytosis  vs.  Exocytosis |  |
| Vesicle |  |

# **Catalyst 3: Transport Review**

**Objective 8:** Explain how homeostasis is maintained in a cell in various environments.

1. The diagrams below represent cells in three different situations. The ovals represent the cells. The diamonds represent nutrient molecules dissolved in the cytoplasm within the cell or the fluid outside of the cell. Use these cells to answer the questions that follow.

|  |  |  |
| --- | --- | --- |
| **A.** | **B.** | **C.** |

**A.** In diagram A, are the nutrient molecules more likely to move into or out of the cell? \_\_\_\_\_\_\_\_\_\_\_\_\_ Why?

**B.** In diagram B, are the nutrient molecules more likely to move into or out of the cell? \_\_\_\_\_\_\_\_\_\_\_\_\_ Why?

**C**. In diagram C, are the nutrient molecules likely to move? If so, where? If not, why?

**D.** In which situation would *water* be more likely to move into the cell? \_\_\_\_\_\_\_\_\_\_\_\_\_ Why?

1. What does it mean for a membrane to be selectively permeable?

Data Collection: In the chart below, record the following for each of the different cells in the different environments:

1. Which direction did the water move?

2. Describe what the cell looks like

**Data**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Red Blood Cell** | **Plant Cell** | **Paramecium** |
| Hypotonic |  |  |  |
| Isotonic |  |  |  |
| Hypertonic |  |  |  |

**Analysis Questions**

1. Did water move into the cell or out of the cell when it was in a *hypotonic* solution? Why did this happen?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Did water move into the cell or out of the cell when it was in a *hypertonic* solution? Why did this happen?

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3. Compare and contrast what happens to an animal cell, a plant cell, and a paramecium cell in each solution.

In hypotonic solution... \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

In isotonic solution... \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

In hypertonic solution... \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. If you took the elodea plant cell or the paramecium cell from a freshwater lake and put them in the ocean, could they be expected to survive? Why or why not?

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5. If you were to grill a steak, would it be better to put salt on it before or after you cooked it? Explain your answer using the term osmosis.

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6. Why does a salad become soggy and wilted when the dressing has been on it for a while? Explain your answer using the term osmosis.

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7. An effective way to kill weeds is to pour salt water on the ground around the plants. Explain why the weeds die using the data you collected in your virtual lab.

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